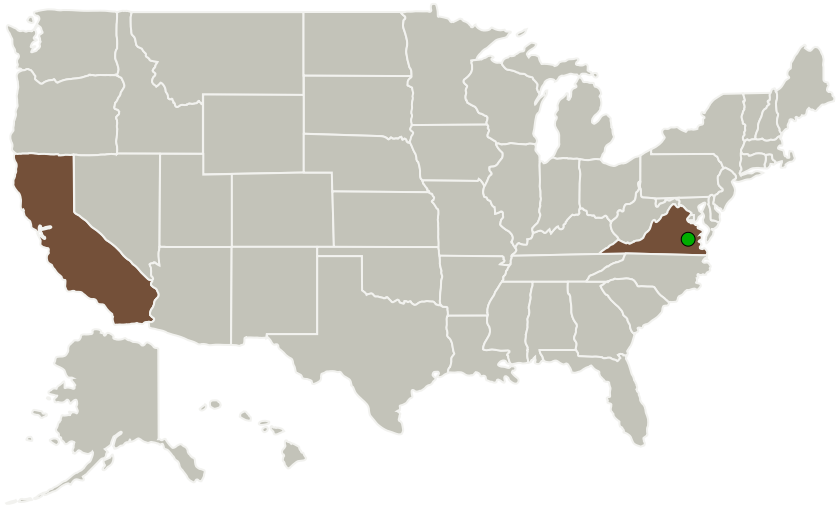
Human Automation Teaming Testbed for Multi-UAS Management (M-HATT), Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Addressing barriers to widespread Unmanned Aircraft Systems (UAS) operations in the NAS is a key goal of NASA research and development (R&D). One such barrier is the lack of tools enabling operators to team with automation to operate multiple UAS with minimal human oversight. This, in turn, requires a flexible testbed enabling research into key human automation teaming (HAT) areas (e.g., seamless sharing/trading of control between human and automation, trust calibration with highly autonomous systems, transparency, and understanding limitations of automation as a teammate). We propose to develop a ground station that serves as a Human Automation Teaming Testbed for management of Multiple UAS (M-HATT). M-HATT will facilitate R&D into HAT requirements by providing a testbed with: a) an architecture interoperable with NASA's Live Virtual Constructive – Distributed Environment (LVC-DE) and international standards (e.g., 4586), and designed with sound properties (modular, flexible, extensible, and scalable); b) tools to configure new experiments without requiring substantial code changes; and c) human-centered interfaces and tools for tuning properties of automation. These capabilities will enable human systems integration (HSI) researchers to rapidly gain insights into challenging HAT research questions. In Phase I, we will define M-HATT requirements and create a proof of concept demonstration. In Phase II, we will implement M-HATT software components, and collaborate with NASA HSI researchers to use M-HATT to perform simulation studies and flight tests, and develop a commercialization plan.

Primary U.S. Work Locations and Key Partners



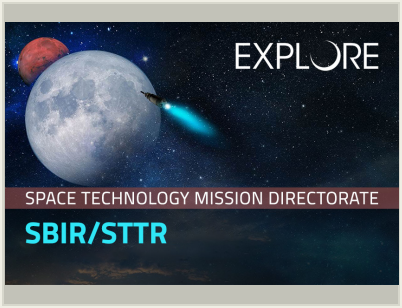


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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Human Automation Teaming Testbed for Multi-UAS Management (M-HATT), Phase I

Completed Technology Project (2015 - 2015)

Organizations Performing Work	Role	Type	Location
Human Automation Teaming Solutions, Inc.	Lead Organization	Industry	Canoga Park, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

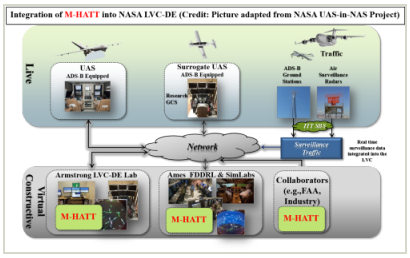
June 2015: Project Start

December 2015: Closed out

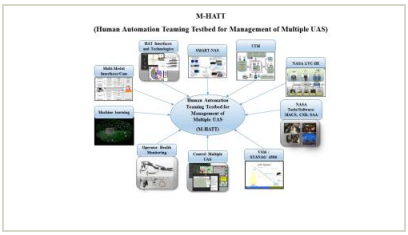
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139089)*

Images



Briefing Chart
Human Automation Teaming Testbed for Multi-UAS Management (M-HATT) Briefing Chart *(https://techport.nasa.gov/image/129817)*



Final Summary Chart Image
Human Automation Teaming Testbed for Multi-UAS Management (M-HATT), Phase I Project Image *(https://techport.nasa.gov/image/128144)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Human Automation Teaming Solutions, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

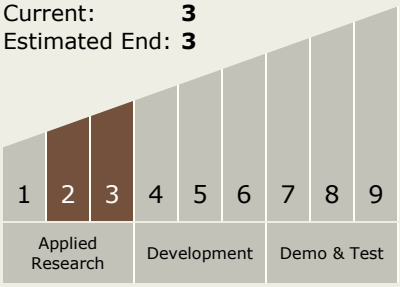
Carlos Torrez

Principal Investigator:

Nhut Tan Ho

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Human Automation Teaming Testbed for Multi-UAS Management (M-HATT), Phase I

Completed Technology Project (2015 - 2015)

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.4 Human-Robot Interaction
    - TX04.4.1 Multi-Modal and Proximate Interaction

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System